



UNIVERSITY OF MAINE AT FARMINGTON  
COLLEGE OF EDUCATION, HEALTH AND REHABILITATION

LESSON PLAN FORMAT

**Teacher's Name:** Ashley Godbout **Lesson #:** 4 **Facet:** Interpretation

**Grade Level:** 8th Grade **Numbers of Days:** 2

**Topic:** Functions

**PART I:**

**Objectives**

Students will understand that the equation  $y=mx+b$  defines a linear function and the constant of proportion (m) is the slope

Students will know  $y=mx+b$ , slope, and y-intercept

Students will be able to evaluate slope (m) as a constant of proportion

**Product:** Google Earth

**Maine Learning Results (MLR) or Common Core State Standards (CCSS) Alignment**

Common Core Standards

**Grade Level:** 8

**Domain:** Functions

**Cluster:** Define, Evaluate, and Compare Functions

**Standards:**

3. Interpret the equation  $y = mx+b$  as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

**Rationale:** Students will find slope and analyze linear equations using Google Earth.

**Assessments**

**Formative (Assessment for Learning)**

**Section I – checking for understanding during instruction**

To check for understanding students will write a response to the prompt question 'explain how you solve for slope?'. They can describe in paragraph form or show understanding by providing an example. It's broad so the teacher will be able to grasp how deep of an understanding students have after using the Google Earth tool.

**Section II – timely feedback for products (self, peer, teacher)**

Students will refer to the rubric that will be used to score their product to self-evaluate their progress. The rubric will always be available to students on the class wiki. The students will hand in their self-assessments so the teacher can evaluate how the class is progressing during this assessment. Aspects of the rubric will include draft work completed by the students to find slope using different variables, final work of trail slope calculations, and Google Earth knowledge.

**Summative (Assessment of Learning):**

Google Earth (50 point): Students will pick a ski mountain in North America and find it's elevation and distance of trails. Students will use Google Earth to find this information and see a visual picture. They will use this information to find the longest and steepest trail the ski mountain offers and continue the same process for the remaining trails on the mountain. Students will include right triangles to find angles and slope.

**Integration**

**Technology:** This lesson incorporates technology by the use of Google Earth.

**Content Areas:** Geography: Students will use their geography knowledge to navigate Google Earth.

**Groupings**

**Section I - Graphic Organizer & Cooperative Learning used during instruction**

Students will use Ticktacktoe grid to organize their Google Earth findings and calculations. Students work in pairs in a Pair Discussion to explore Google Earth and figure out how to find the measurements and calculations they need. The teacher won't give this instruction to the students; they will figure it out on their own while exploring the technology. A second cooperative learning activity will include groups of three by the use of a random generator online. Their task will be to locate a handicapped ramp either in the school or outside of the school and they are to find the slope of the ramp. They will use their previous knowledge of triangles, distance formula and linear equations to complete this task.

## **Section II – Groups and Roles for Product**

Students will hand in their own product but they will have the opportunity to work in pairs or groups throughout the process. The pairs will be picked at random for the discussion. Students will all have a card with a symbol on it under their chair when they enter the room. When it is time for this activity students will reach for the card and gather into pairs according to the matching symbols.

## **Differentiated Instruction**

### **MI Strategies**

**Verbal:** To check for understanding the student responds to the prompt question delivered by the teacher. The expectation is that they write or type their response to the teacher but a request can be made to verbally address the prompt.

**Visual:** Students will use Google Earth to picture the image of the trails and mountain. They will use excel to put their calculations into a spreadsheet that will output a graph that will illustrate the slope of the trails.

**Kinesthetic:** The cooperative learning activity includes students locating a ramp on school grounds and physically measuring it to find the slope of the ramp.

**Interpersonal:** Students work together to explore Google Earth and how to find calculations and measurements of trails.

**Intrapersonal:** Students will work individually on this project and assess their own work using the same rubric the teacher will use to score their project.

**Naturalist:** Students that are interested in skiing and winter activities can relate to the project because they can pick any ski mountain and will end up finding the slope of the trails on the mountain.

### **Modifications/Accommodations**

**From IEP's ( Individual Education Plan), 504's, ELLIDEP (English Language Learning Instructional Delivery Education Plan)** I will review student's IEP, 504 or ELLIDEP and make appropriate modifications and accommodations.

**Plan for accommodating absent students:** If students are absent during this lesson they will be expected to refer to the class wiki for directions and resources. It is important they see the teacher and talk with students because this lesson is very in depth and students can easily fall behind if they don't get caught up right away. They should set up an appointment with the teacher as soon as they return to school. If the student is aware of their absence ahead of time they will be expected to work on the assignment while away from class to prevent falling behind.

### **Extensions**

#### **Type II technology:**

Google Earth is type II technology because it allows students to view places anywhere in the world in 3D. More specifically to my lesson, this program will allow my students to research dimensions of ski mountains to be able to find the slope of certain trails. Students will be able to calculate the slope from the dimensions the program gives them specific to any ski resort they choose.

#### **Gifted Students:**

Students will be given the option to use the dimensions of the trail to find angle measurements. They will draw a right triangle given the slope and elevation of the mountain and find the angle measurements using properties of sin and cos.

### **Materials, Resources and Technology**

Teacher laptop

Student laptops  
Google Earth software  
Algebra Textbook  
Graph paper  
SmartBoard

### Source for Lesson Plan and Research

Algebra Textbook

Google Earth Support

<http://support.google.com/earth/?hl=en>

Lesson Plan Idea:

<http://www.gelessons.com/lessons/studentcontrol/k12math/xtremetriangles/index.html>

Class Wiki:

[wikispaces.com](http://wikispaces.com)

Graphic Organizer:

<http://www.eduplace.com/graphicorganizer/pdf/persuasion.pdf>

Cooperative Learning:

[Think-Pair-Share](#)

Content Resources:

<http://www.themathpage.com/alg/slope-of-a-line.htm>

Hook:

<http://www.youtube.com/watch?v=PPXx-43ke-g>

<http://www.youtube.com/watch?v=QaifzeGAvB8>

### PART II:

**Teaching and Learning Sequence (Describe the teaching and learning process using all of the information from part I of the lesson plan)** *Take all the components and synthesize into a script of what you are doing as the teacher and what the learners are doing throughout the lesson. Need to use all the WHERETO's. (3-5 pages)*

Room Arrangement: The desks will be placed in rows with two desks side by side in each section.

Agenda:

Day one (80 minutes)

- Hook (5 minutes)
- Discussion about hook (5 minutes)
- Lesson presentation (30 minutes)
- Project introduction (20 minutes)
  - Expectation and rubric (10 minutes)
  - Questions and Google Earth Support Review (10 minutes)
- Cooperative Learning (20 minutes)

Day two (80 minutes)

- Questions and Review (10 minutes)
- Graphic organizer (30 minutes)
- Work on project (40 minutes)

Homework: Finish Assignment

Students will understand that the equation  $y=mx+b$  defines a linear function and the constant of proportion ( $m$ ) is the slope. Slope is used for building roads, handicap ramps, roofs, and applied to ski mountains, roller coasters, skate ramps, and much more. *Interpret the equation  $y = mx+b$  as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.* Class will begin by playing a rap video about slope and the use of linear equations.

**Where, Why, What, Hook, Tailors:** Logical, Verbal, Interpersonal, Visual

Students will know  $y=mx+b$ , slope, and y-intercept. Students will use Ticktacktoe grid to organize their Google Earth findings and calculations. Students work in pairs in a Pair Discussion to explore Google Earth and figure out how to find the measurements and calculations they need. The teacher won't give this instruction to the students; they will figure it out on their own while exploring the technology. To check for understanding students will write a response to the prompt question 'explain how you solve for slope?'. They can describe in paragraph form or show understanding by providing an example. It's broad so the teacher will be able to grasp how deep of an understanding students have after using the Google Earth tool.

**Equip, Explore, Rethink, Tailors:** Logical, Intrapersonal, Interpersonal, Naturalist, Verbal, Visual

Students will pick a ski resort in North and America and use Google Earth to apply elevation and distance of trails to find the slopes of trails on the mountain. The students will pick a ski resort in North and America and use Google Earth to apply elevation and distance of trails to find the slopes of trails on the mountain. When everyone has completed their project we will spend a day presenting the findings. Every student will show their mountain and explain the calculations they got. Students will participate in the cooperative learning activity and then begin to work on their graphic organizer. Students will have time to explore Google Earth and have access to the teacher to ask questions. Students will hand in their own product but they will have the opportunity to work in pairs or groups throughout the process. The pairs will be picked at random for the discussion. Students will all have a card with a symbol on it under their chair when they enter the room. When it is time for this activity students will reach for the card and gather into pairs according to the matching symbols. To check for understanding students will write a response to the prompt question 'explain how you solve for slope?'. They can describe in paragraph form or show understanding by providing an example. It's broad so the teacher will be able to grasp how deep of an understanding students have after using the Google Earth tool.

**Explore, Experience, Revise, Refine, Tailors:** Logical, Interpersonal, Intrapersonal, Verbal, Kinesthetic

Students will refer to the rubric that will be used to score their product to self-evaluate their progress. The rubric will always be available to students on the class wiki. The students will hand in their self-assessments so the teacher can evaluate how the class is progressing during this assessment. Aspects of the rubric will include draft work completed by the students to find slope using different variables, final work of trail slope calculations, and Google Earth knowledge. Students will use their knowledge of slope in future lessons when they are analyzing two variable equations.

**Evaluate, Tailors:** Logical, Intrapersonal, Verbal, Visual

### Content Notes

Students will know  $y=mx+b$ , slope, and y-intercept



### Lesson 4.pdf

- [DetailsDownload](#) 157 KB

### Handouts

Graphic Organizer

Rubric

## Maine Common Core Teaching Standards for Initial Teacher Certification and Rationale

**Standard 1 – Learner Development.** *The teacher understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences.*

**Beach Ball** (variety of resources, adaptive environment, various manipulative(s), choices of activities, spontaneity, extensions to activities and personal freedom),

**Clipboard** (organization, structure, visual directions, clear closure, sequential learning, clear procedures, consistent routines, clear expectations),

**Microscope** (discovery learning, analyzing concepts, deep exploration, discussion, focus on details, ownership), and

**Puppy** (comfortable environment, encouraging atmosphere, supportive grouping, safe climate, respectful colleagues, empathic listeners, sensitive peers)

### ***Learning Styles***

**Clipboard:** There will be clear directions and expectations posted on the class wiki. The teacher will also present this information in front of the class. Students will use their knowledge of slope to complete the hook, then we will proceed go more in depth in the concept. The student will always know what's expected of them.

**Microscope:** Students will be introduced to a new technology during this assignment. They will have to analyze the 3D picture of the mountain and assess how they are going to retrieve the necessary information. There will many opportunities for discussion between students and with the teacher during this process.

**Puppy:** Since this program will be new to most student's they will be figuring out how to use it collectively. They will use the support of their peers to complete this project in a comfortable and safe environment. It is expected that they are respectful of each other and their work.

### ***Beach Ball:***

The students will be able to pick where and which mountain they choose. They will have the option to complete the extension assignment listed under the gifted student section. This option will be for all students.

**Rationale:** This lessons meets the standard because the teacher includes previous knowledge and introduces new information in a strategic, logical way. Students will be engaged throughout this lesson because of the organized structure, the freedom they're given, and the technology used.

***Standard 6 - Assessment. The teacher understands and uses multiple methods of assessment to engage learners in their on growth, to monitor learner progress, and to guide the teacher's and learner's decision making.***

### ***Formative:***

#### **Section I – checking for understanding during instruction**

To check for understanding students will write a response to the prompt question 'explain how you solve for slope?'. They can describe in paragraph form or show understanding by providing an example. It's broad so the teacher will be able to grasp how deep of an understanding students have after using the Google Earth tool.

#### **Section II – timely feedback for products (self, peer, teacher)**

Students will refer to the rubric that will be used to score their product to self-evaluate their progress. The rubric will always be available to students on the class wiki. The students will hand in their self-assessments so the teacher can evaluate how the class is progressing during this assessment. Aspects of the rubric will include draft work completed by the students to find slope using different variables, final work of trail slope calculations, and Google Earth knowledge.

### ***Summative:***

Google Earth (50 point): Students will pick a ski mountain in North America and find it's elevation and distance of trails. Students will use Google Earth to find this information and see a visual picture. They will use this information to find the longest and steepest trail the ski mountain offers and continue the same process for the remaining trails on the mountain. Students will include right triangles to find angles and slope.

**Rationale:** Formative assessments will be used multiple times to engage students in their growth and give the teacher feedback on the students progress. The paragraph response from students will give the teacher important feedback when planning for advancement during the lesson. The summative assessment will show the teacher which students have developed mastery and what areas they still need to develop further.

***Standard 7 - Planning Instruction. The teacher plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context.***

### ***Content Knowledge:***

Students will know  $y=mx+b$ , slope, and y-intercept

**CCSS:**

Common Core Standards

**Grade Level:** 8

**Domain:** Functions

**Cluster:** Define, Evaluate, and Compare Functions

**Standards:**

3. Interpret the equation  $y = mx+b$  as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

**Rationale:** Students will find slope and analyze linear equations using Google Earth.

**Facet:** Interpretation

**Standard 8 - Instructional Strategies.** *The teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways.*

**MI Strategies:**

**Verbal:** To check for understanding the student responds to the prompt question delivered by the teacher. The expectations is that they write or type their response to the teacher but a request can be made to verbally address the prompt.

**Visual:** Students will use Google Earth to picture the image of the trails and mountain. They will use excel to put their calculations into a spreadsheet that will output a graph that will illustrate the slope of the trails.

**Kinesthetic:** The hook activity has students locating a ramp on school grounds and physically measuring it to find the slope of the ramp.

**Interpersonal:** Students work together to explore Google Earth and how to find calculations and measurements of trails.

**Intrapersonal:** Students will work individually on this project and assess their own work using the same rubric the teacher will use to score their project.

**Naturalist:** Students that are interested in skiing and winter activities can relate to the project because they can pick any ski mountain and will end up finding the slope of the trails on the mountain.

**Type II Technology:** Students will use Google Earth.

**Rationale:**

This lesson includes six of the multiple intelligences. Students will be engaged in a variety of ways. Mainly, the new technology program and activity will be the most engaging for students. Incorporating a real life example into a project is a huge motivator for students and will get them involved in learning math content.

**NETS STANDARDS FOR TEACHERS**

**1. Facilitates and Inspire Student Learning and Creativity. Teachers use their knowledge of subject matter, teaching and learning, and technology to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments.**

a. Promote, support, and model creative and innovative thinking and inventiveness

b. Engage students in exploring real-world issues and solving authentic problems using digital tools and resources

c. Promote student reflection using collaborative tools to reveal and clarify students' conceptual understanding and thinking, planning, and creative processes

d. Model collaborative knowledge construction by engaging in learning with students, colleagues, and others in face-to-face and virtual environments

**Rationale:**

Students will collaborate during class time when involved in cooperative learning and checking for understanding. They will be arranged in groups at their desks so they have constant contact with each other. They will be in groups during cooperative learning activities as well. They will have the resources to e-mail each other outside of class and post on the class wiki. Students will reflect many times when journaling, participating in cooperative learning, and when peer and self-assessing.

**2. Design and Develop Digital Age Learning Experiences and Assessments. Teachers design, develop, and evaluate authentic learning experiences and assessment incorporating contemporary tools and resources to maximize content learning in context and to develop knowledge, skills, and attitudes identified in the NETS-S.**

- a. Design or adapt relevant learning experiences that incorporate digital tools and resources to promote student learning and creativity
- b. Develop technology-enriched learning environments that enable all students to pursue their individual curiosities and become active participants in setting their own educational goals, managing their own learning, and assessing their own progress
- c. Customize and personalize learning activities to address students' diverse learning styles, working strategies, and abilities using digital tools and resources
- d. Provide students with multiple and varied formative and summative assessments aligned with content and technology standards and use resulting data to inform learning and teaching

***Rationale:***

This lesson has students using Google Earth to find calculations and navigate areas of the world. For people who have an interest in geography or even the sport of skiing this is a perfect lesson for them to explore something they are interested in while learning content simultaneously. Students will have the opportunity to self-assess and peer assess their progress and reflect on questions asked by the teacher.teacher.